

PRESS RELEASE

Fourier Transform Infrared Spectroscopy – new capabilities at Campden BRI

Recent developments in techniques under the broad umbrella of chemical analysis have allowed the investigation and solving of problems that were previously difficult to understand. One technique in which Campden BRI has made significant investment is Fourier transform infra-red spectroscopy, exemplified by the acquisition of an Agilent 670 FT-IR Spectrometer and an Agilent 620 FTIR microscope, fitted with a state of the art Focal Plane Array Detector. Microscopist Mike Edwards explains:

“FTIR enables us to confirm the identity of many materials. It is based on the interaction of infra-red light with chemical bonds in the material being studied, such as C-O, C-H or C-N. Individual spectra provide a ‘fingerprint’ of individual molecules, which can be used in the identification of incoming raw materials, determination of contamination, including deliberate adulteration (e.g. palm oil addition to virgin olive oil), and quality issues (such as sugar/acid ratio in tomatoes), as well as to identify the chemical composition of foreign bodies.

Infra-red spectroscopy has been an important analytical tool for many years, but recent advances have increased its usefulness. Application of Fourier Transform techniques to the results has lowered the detection limit from the microgram to the nanogram range and from the ppm to ppb level.

FT-IR microscopy can be used to study the chemical composition of very small samples (micro-sized). However, its most valuable application is in the chemical mapping of a sample of varying composition, such as a wheat grain or plastic laminate, so that the chemical identity of particular components can be determined. Most FT-IR microscopes use either a single detector, where a matrix of individual measurements is slowly developed in order to build up a chemical map. Others use a linear array detector in which a row of single detector elements is moved slowly across a sample to build up the map line by line. However, the Agilent 620 has a Focal Plane Array Detector with up to 128 x 128

individual elements, allowing a two-dimensional chemical map to be acquired very quickly. FT-IR microscopes equipped with a Focal Plane Array Detector are very rare. As well as dramatically speeding up data acquisition, this enables studies to be carried out on samples which would deteriorate over the time taken to acquire data using slower technologies.”

FTIR spectroscopy and microscopy are powerful techniques – for more information contact Dr. Mike Edwards +44(0)1386 842017 mike.edwards@campdenbri.co.uk

*** Ends ***

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Notes to editors

1. An accompanying photograph is available from Mr Tim Hutton, Campden BRI, Station Road, Chipping Campden, Glos. GL55 6LD, UK. t.hutton@campden.co.uk +44(0)1386 842047
2. [Campden BRI](#) specialises in the practical application of technical excellence to support the food and allied industries through analysis and testing, operational support, research and innovation, and knowledge management. It is the world's largest membership-based food research organisation, with nearly 400 staff based at its three sites: Chipping Campden (Headquarters), Nutfield (Surrey - brewing division), and Budapest (Hungary).
3. Its activities include assuring the safety of food and drinks, [food processing and manufacturing](#) support, [food analysis and testing](#), [training](#) and [publishing](#). Each year it hosts hundreds of business visits and trains around 6,000 people from food and drink companies worldwide. Further information on its activities can be found at www.campden.co.uk
4. Expertise at Campden BRI includes:
 - a. [manufacturing technologies](#) - food processing (heating, chilling, freezing), aseptic technology, [microwave heating](#), [malting and brewing](#), [milling](#), [baking](#) and extrusion technology, and process control and instrumentation, [packaging technology](#)
 - b. safety assurance - including [hygiene and sanitation](#), [microbiology](#) and preservation, processing technologies, analysis and testing (microbiological, chemical), and quality and safety management,
 - c. [product development](#) and quality, [consumer studies](#), market insights, [sensory science](#), [authenticity testing](#), shelf-life evaluation, [labelling](#) and [legislation](#)
 - d. [agri-food production](#), ingredients, raw materials, raw material technology,
 - e. underpinning science - [cereal science](#), [microbiology](#), [chemistry and biochemistry](#), molecular biology
5. Facilities at Campden BRI include:
 - a. 3,000 sq m of laboratories for food and drink microbiology, hygiene, chemistry, biochemistry, molecular biology, brewing and cereal science, and packaging technology

- b. 3,500 sq m food process hall and [pilot plant](#) including malting and brewing, retorting, chilling, milling, baking, hygiene and packaging
- c. 800 sq m of dedicated training and conference facilities